

REMARKS

Claims 1-41 are pending in this application. Claims 39-41 have been newly added.

I. Election/Restrictions

The Examiner has stated that the requirement is still deemed proper and that this application contains claims 18-23 drawn to an invention nonelected with traverse in Application No. 10/684520. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144). See MPEP 821.01.

However, the Applicant reserves the right to file a petition to the final requirement for restriction. In addition, cancellation of the non-elected claims are not appropriate at this time because of according to MPEP §821.04 in the *In re Ochiai* rejoinder, even when there is even a proper restriction between product and process claims and when the product claims are elected, and the product claims are allowable, the process claims that include all the limitations of the allowable product claims would also be allowable. Therefore, claim 18-23 can be allowed because of rejoinder under MPEP §821.04 when the product claims are allowed and include all the limitations of the allowable product claims of any one of claims 1-17, or 24-38 are allowed. Therefore, the Applicant reserves the right to rejoin the non-elected claims and therefore, is not required to cancel the non-elected claims at this time. Therefore, the applicant respectfully requests that the examiner temporarily hold objections and requirements as to form in abeyance until the remarks and

amendments in this Amendment are considered by the examiner.

I. Claim Rejections - 35 USC § 102

A. Claims 1, 5-6, 8-10, 15, 24-29, 31-33, 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Uemura et al. (US 6239547 B1). The Applicant respectfully traverses.

1. The Examiner disagrees with the Applicant argument that Uemura fails to disclose the carbon nanotube (hereinafter referred to as CNT) layer being provided on the base layer in a state substantially un-mixed with the base layer. The Examiner states that the degree at which the CNT is unmixed is determined by the fact that a distinction between the two different layers is made (1) a graphite column layer (distinguished as 421) and (2) a base layer (distinguished as 422) used as a binder. Hence, the Examiner states that the CNTs are inherently substantially unmixed.

As mentioned above by the MPEP §2131, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Each of the elements are not expressly described. Inherent description is also not pertinent in this discussion, because inherency is involved only where a minor, well-known feature is lacking. Further the CCPA has added that “inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of

circumstances is not sufficient.” *In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981). As mentioned in the claim and specification of the present invention, the carbon nanotube layer being provided on the base layer in a state substantially un-mixed with the base layer is not just a minor point.

Importantly, the Applicant, respectfully notes to the Examiner that figure 9B and related disclosure does not disclose that the CNT is substantially unmixed with the base layer as the base layer 905 fails to show how the CNT is within the layer 905.

In layer 905, there can be CNT embedded in the layer. As seen in figure 15 and 16 in the present application, the conventional methods include many embedded CNT, and many CNT exposed. As mentioned in paragraph [0008] of the present application in the background section, “Although the carbon nanotubes 3a protrude from the surface of the conventional electron emission source 1, the carbon nanotubes 3b (*i.e.*, most of the carbon nanotubes) are embedded in the solid granules.” Further, as seen in figure 16, portions of the exposed CNT can be bent or curled in the base layer such that the CNT is not substantially unmixed.

The related disclosure to figure 9B, only states that the “tips” of the CNT of some but not all the CNT are exposed. It is clear that “tip” is only referring the end of the CNT and not a substantial portion.

In addition; according to MPEP §2125 under the heading “DRAWINGS AS PRIOR ART” and under the subheading “PROPORTIONS OF FEATURES IN A DRAWING ARE NOT EVIDENCE OF ACTUAL PROPORTIONS WHEN DRAWINGS ARE NOT TO SCALE”, the

MPEP states “When the reference does not disclose that the drawings are to scale and is silent as to dimensions, **arguments based on measurement of the drawing features are of little value.** However, the description of the article pictured can be relied on, in combination with the drawings, for what they would reasonably teach one of ordinary skill in the art. *In re Wright*, 569 F.2d 1124, 193 USPQ 332 (CCPA 1977).

Therefore, the description, clearly only mentions “tips” which clearly is not a substantial portion and there is no disclosure in the drawings and related specification concerning how the CNT is within the base layer as seen in figure 9B, Uemura is devoid of any details of the CNT or other description.

Therefore, as mentioned above, “may” result form a given set of circumstance is not enough of a disclosure in Uemura to constitute anticipation.

2. Regarding Fig. 7, Col. 12, lines 39-48, the Examiner invites applicant to indicate where Uemura teaches that the CNTs are “substantially embedded” in the base layer. The Examiner states that the electron-emitting terminals of Uemura’s CNTs are hidden in Fig. 7A, the terminals of the CNTs are clearly exposed, in Figs. 7C & 7E, as a result of irradiation of the top portion of the subsequent silver particles of the base layer.

Respectfully, it is not imperative upon the Applicant to prove that Uemura teaches substantially embedded, but it is imperative that the Examiner bear the burden of proving substantially un-mixed, which as shown above, Uemura does not disclose and is appealable.

Moreover, whether CNT are exposed or shown, do not indicate either way that they are substantially mixed or not.

In addition, Uemura discloses, as mentioned above, only that the “tips” are exposed and so there is no indication that the CNT is substantially unmixed as Uemura only states that “On the electron-emitting surface, the tips of the graphite columns 901 are exposed.” The tips being exposed do not indicate that the CNT is unmixed. Moreover, the graphite column is not just CNT, but “As described above, the graphite column 901 is made of an aggregate of carbon nanotubes and carbon nanopolyhedrons” as seen in figure 9.

3. Regarding Claims 1, 24, the Examiner disagrees in paper no. 20060302, that Uemura does not indicate a predetermined thickness for the base layer. The Examiner states that Uemura discloses some base layer (422) utilized to “fix” the graphite columns (421) to some substrate, suffices that the distinction of a base layer, different from that of the graphite columns, establishes that Uemura’s base layer thickness must fall within some predetermined thickness.

However, Uemura states, “The electrode 406b and the graphite columns 421 fixed with the conductive adhesive 422 constitute an electron-emitting source.” The conductive adhesive could have any sort of thickness and it is not clear that it is specifically or has to be a certain or predetermined (determined beforehand) thickness. There is no indication that the thickness *must* be determined beforehand, but rather there exists a base layer which could be any thickness and not necessarily predetermined.

4. With respect to Claim 9, the Examiner states that Uemura teaches that the base layer (905, see at least Fig. 9B) includes spherical particles with a diameter of 0.05 to 5 μm , creating prominences and depressions (Fig. 7) on the outer surface of the base layer accommodating the same prominences and depressions in the carbon nanotube layers, below the carbon nanotube layer (Col. 5, lines 42-45; Col. 11, lines 65-67; Col. 17, lines 10-11; Col. 11, lines 13-17).

In paper no. 20060302, the Examiner argues that Regarding Claims 9, 15, 32, 38, Uemura does disclose the spherical particles below the CNT layer as the Examiner ties to the same concept of a notable distinction between the two different layers is made (1) a graphite column layer (distinguished as 421) and (2) a base layer (distinguished as 422) used as a binder, hence having a substantial degree of unmixing, the spherical particles, such as Ag, are *inherently* formed below the provided CNT layer.

However, as mentioned above, inherency should not be used to such an extent to limitations that are not minor.

For further clarification, examiner additionally refers to Col. 11, lines 13-17, wherein Uemura discloses the graphite column powder layer being “deposited on not only the conductive adhesive (applicant’s “base layer”) ...” but that a deposition of CNT is practice upon the preset conductive adhesive, teaches that while there may be some mixing of CNT and base layer, a separation is present nonetheless.

However, this does not show that the base layer is below the CNT layer as col. 11, lines 13-17 is only indicating that the graphite column powder is deposited on the remaining region to be later removed in the other region except the conductive adhesive layer.

B. Claims 1-2, 4, 24-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakada et al. (US 6455989 B1). The Applicant respectfully traverses.

1. With respect to Claim 1, the Examiner states that Nakada teaches the base layer connecting the carbon nanotube layer to the one of the first and second substrates on which the electron emission sources are provided and having conductivity for applying a voltage to the carbon nanotube layer required for the emission of electrons, and with the base layer having a predetermined thickness, and the carbon nanotube layer being provided on the base layer in a state substantially un-mixed with the base layer (Figure 6).

However, specifically in the MPEP §2125 under the heading “DRAWINGS AS PRIOR ART” and under the subheading “PROPORTIONS OF FEATURES IN A DRAWING ARE NOT EVIDENCE OF ACTUAL PROPORTIONS WHEN DRAWINGS ARE NOT TO SCALE”, the MPEP states “When the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value. However, the description of the article pictured can be relied on, in combination with the drawings, for what they would reasonably teach one of ordinary skill in the art. *In re Wright*, 569 F.2d 1124, 193 USPQ 332 (CCPA 1977). Therefore, the figure 6 in itself cannot be properly relied upon as

indication of no substantial mixing as the Examiner indicates. There is no indication concerning the mixing of carbon nanotubes and its relationship with the base layer. There must be a disclosure as exactly arranged in the claims. Moreover, there is no disclosure that the thickness of the base layer is actually determined before hand.

2. Regarding Claims 1, 24, the Examiner disagreed with the Applicant's argument that Nakada's projecting structure 161 is not structurally comparable to the base layer of the present invention. The Examiner states that the CNT layer is provided on Nakada's projecting structure is basis alone for substantiating its entitlement as the claimed "base layer." The Examiner states that inherently, any such layer that a CNT layer is formed on may be portrayed as a base layer thereof.

However, according to MPEP §2112, "examiner must provide rationale or evidence tending to show inherency" such that "The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999)

(citations omitted).

Therefore, one cannot assume that 161 is the base layer.

Secondly, looking at the claim language of claim 1, the base layer has a substantially vertical flank, whereas the layer in Nakada, quite clearly, has a trapezoidal shape.

The Examiner disagrees with the applicant's argument that Nakada fails to disclose the CNT layer being provided on the base layer in a state substantially unmixed with the base layer. The Examiner states that a distinction is made between Nakada's projecting structure 161 and Nakada's CNT layer 16a is basis enough for the two layers, one being formed on the other to be substantially unmixed. However, as shown above, the present invention has a vertical flank, while Nakada's 161 layer does not and therefore, it is clear that the CNT is not substantially unmixed.

In addition, there is nothing in Nakada that actually discloses identically as arranged in the claim, the CNT being substantially unmixed with the base layer.

II. Claim Rejections - 35 USC § 103

A. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al.

(US 6455989 B1) in view of Choi et al. (US 2001/0006232 A1). The Applicant respectfully traverses.

With respect to Claim 3, the Examiner states that it would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify the structure of the electron emission inducing assembly, as disclosed by Choi, in the field emission display of Nakada and that the motivation to combine would be to ensure easier manufacturing of such an FED device.

However, “easier manufacturing” is a broad generalized statement that is prohibited under *In re Dembicza*k, which requires that the showing must be “clear and particular. . *In re Dembicza*k, 175 F.3d 994, 50 USPQ.2d 1614 (Fed. Cir. 1999).

B. Claims 7, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al. (US 6239547 B1) in view of Ito (US 6885142 B2). The Applicant respectfully traverses.

With respect to Claim 7, the Examiner states that Uemura lacks a frit glass from the group consisting of PbO, SiO₂, Ba₂O₃, but that in the same field of endeavor, Ito teaches a glass frit that selected from the group consisting of PbO, SiO₂, Ba₂O₃ (Col. 2, lines 2-7) for the purpose preventing softening of the sealing portion including the frit glass during device manufacturing (Col. 2, lines 2-7), as Ito teaches the suitability of using a glass frit formed of the group consisting of PbO, SiO₂, Ba₂O₃. Therefore, the Examiner states that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the composition of the group consisting of PbO, SiO₂, Ba₂O₃, as disclosed by Ito, in the device of Uemura in order ensure the prevention of softening of the sealing portion including the frit glass during device manufacturing and to choose from one

of the materials disclosed by Ito, since Ito teaches the suitability of using a glass frit formed a the group consisting of PbO, SiO₂, Ba₂O₃ and it has been held to be within the general skill of an artisan to select a known material on the basis of the intended use. See MPEP 2144.07.

However, first, Ito is not in the same field of endeavor as Ito deals with a "Funnel for Color Cathode Ray Tube" and not a field emission display as claimed by the present invention. Ito is not an analogous art. Respectfully, according to MPEP §2141.01(a) and cases such as *In re Oetiker* cited above, the reference of Ito is not within the field of applicant's endeavor, and is not reasonably pertinent to the particular problem with which the inventor was concerned because it has to be shown that person of ordinary skill, seeking to solve a problems of the field emission displays of the present invention would not be reasonably be expected or motivated to look to funnels for cathode ray tubes that are trying to solve the problem of cathode ray tubes rather field emission devices. Therefore, since Ito is not an analogous prior art, the combination does not render the present invention as obvious.

Secondly, to say that Ito teaches the suitability of using a glass frit formed a the group consisting of PbO, SiO₂, Ba₂O₃ and it has been held to be within the general skill of an artisan to select a known material on the basis of the intended use according to MPEP 2144.07 is not a proper application of MPEP §2144.07, especially since Ito concerns a cathode ray tube and not a field emission display.

C. Claims 14, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al. (US 6455989 B1) in view of Lee et al. (US 2002/0175617 A1). The Applicant respectfully traverses.

With respect to Claim 14 and 37, the Examiner states that Nakada is silent regarding the thickness of the base layer, but that in the same field of endeavor, Lee teaches that the base layer (nanotube emitter layer, Figure 2, #52) is formed at a thickness of 0.05 to 5 µm (Page 3, Par [0016]) in order to ensure sufficient mechanical support of respective nanotubes; therefore, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify the thickness of the base layer, as disclosed by Lee, in the field emission display of Nakada; motivation to combine would be to ensure sufficient mechanical support of respective nanotubes.

Again, as mentioned above, “sufficient mechanical support of respective nanotubes” is an improper motivation as it is not clear and particular. The motivation cannot be taken lightly as there is an importance in showing such, otherwise, the present invention would be used as a blue-print to formulating a rejection, rather than the prior art. See *In re Dembiczaik*, 175 F.3d 994, 50 USPQ.2d 1614 (Fed. Cir. 1999).

In addition, figure 2 of Lee is the prior art and not the teaching of Lee. Lee is teaching away from the prior art of figure 2. Lee in the background section indicates how the prior art is problematic and that invention of Lee solves the failings of the prior art.

According to MPEP §2145, “It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir.

1983). This portion of Lee cannot be just ignored because according to MPEP §2141.02, “A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).”

D. Claims 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al. (US 6239547 B1) in view of Cole et al. (US 6919730 B2). The Applicant respectfully traverses.

With respect to Claim 34, the Examiner states that Uemura is silent regarding the dimensions of the prominence and depressions of the base layer, but that in the same field of endeavor, Cole teaches that the prominence and depressions (combination of 220 & 235, see at least Fig. 2D) at 0.05 to 10 μm width, 0.01 to 5 μm depth, and 1 to 20 μm intervals (Col. 3, lines 17-27) in order to provide the ability to better control temperature response of a plurality of nanotubes to radiation.

However, as seen col. 3, lines 17-27, Cole is not referring to prominences and depressions of the base layer itself, but between different units of the base layers as it states, “Using common photolithographic techniques, several islands or platforms are formed as shown in Fig. 2B...In one embodiment, the platforms are 1-5 micron rectangles, with a 1-5 micron spacing.” As seen in figure 2B and 2D, the base layer itself does not have prominences and depressions, but are referring to the different sets of layers. The presently claimed invention clearly states, *the base layer includes a film having prominences and depressions*, which then clearly refers to the base layer itself and not between separate base layer units.

In addition, both Nakada and Cole teach away from prominences and depressions of the base layer itself, as they include flat portions on the base layers. Cole includes separate electron emission sources as the Examiner is referring to and not within the same electron emission source.

E. Claims 11, 16, are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al. (US 6455989 B1) in view of Cole et al. (US 6919730 B2). The Applicant respectfully traverses.

With respect to Claim 11, the Examiner stated that Nakada is silent regarding the dimensions of the prominence and depressions of the base layer, but that in the same field of endeavor, Cole teaches that the prominence and depressions at 0.05 to 10 μm width, 0.01 to 5 μm depth, and 1 to 20 μm intervals (Col. 3, lines 17-27) in order to provide the ability to better control temperature response of a plurality of nanotubes to radiation.

However, as shown above, Cole is referring between base layer units, but not the base layer itself as the claims clearly states *the base layer includes a thin film having prominences and depressions* and so the dimensions given are not applicable.

In addition, both Nakada and Cole teach away from prominences and depressions of the base layer itself, as they include flat portions on the base layers themselves. Cole includes separate electron emission sources as the Examiner is referring to and not within the same electron emission source.

F. Claims 12, 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al. (US 6455989 B1) in view of Cole et al. (US 6919730 B2) with further consideration to Mau et al. (US 6866801 B1). The Applicant respectfully traverses.

With respect to Claim 12 and 35, the Examiner states that Nakada-Cole fails to teach the claimed composition of the prominence and depressions of the base layer, but that in the same field of endeavor, Mau teaches that the prominence and depressions are formed of indium thin oxide (Col. 2, lines 65-67 - Col. 3, lines 1-8) in order to provide sufficient thermal stability according to the [CNT growth] synthesis temperature applied (Col. 2, lines 56-67).

However, it is clear that in fact Nakada and Cole teaches away from the thin film having prominences and depressions as both Nakada and Cole fail to have a film included in the base layer itself having prominences and depressions, but rather a flat surface.

In addition, it is not taught or suggested in Mau, that the prominences are from a thin film included in the base layer as seen in figure 2a and b, as the CNT is formed on a layer and then a separate polymer layer is formed. Therefore, the thin film does not include the prominences and depressions, but is a separate layer. The separate layer is separating the different electron emission sources and is not related to the particular source.

G. Claims 13, 17, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al. (US 6455989 B1) in view of Lee et al. (2002/0175618 A1). The Applicant .

respectfully traverses.

With respect to Claim 13, the Examiner states that Nakada is silent the respective densities of the base layer and carbon nanotube layer, but that in the same field of endeavor, Lee teaches a carbon nanotube density of the carbon nanotube layer being greater than the carbon nanotube density of the base layer (Page 3, Par [0018]).

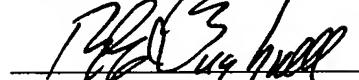
However, paragraph 18 of Lee only teaches that a higher density of CNT has an undesirable effect and therefore, clearly teaches away from the claimed invention.

In view of the foregoing amendments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. If there are any questions, the examiner is asked to contact the applicant's attorney.

A fee of \$150 is incurred by this Amendment for the addition of three (3) claims above thirty-eight (38). Applicant's check drawn to the order of the Commissioner accompanies this Amendment. Should there be a deficiency in payment, or should other fees be incurred, the Commissioner is authorized to charge Deposit Account No. 02-4943 of Applicant's undersigned attorney in the

amount of such fees.

Respectfully submitted,



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